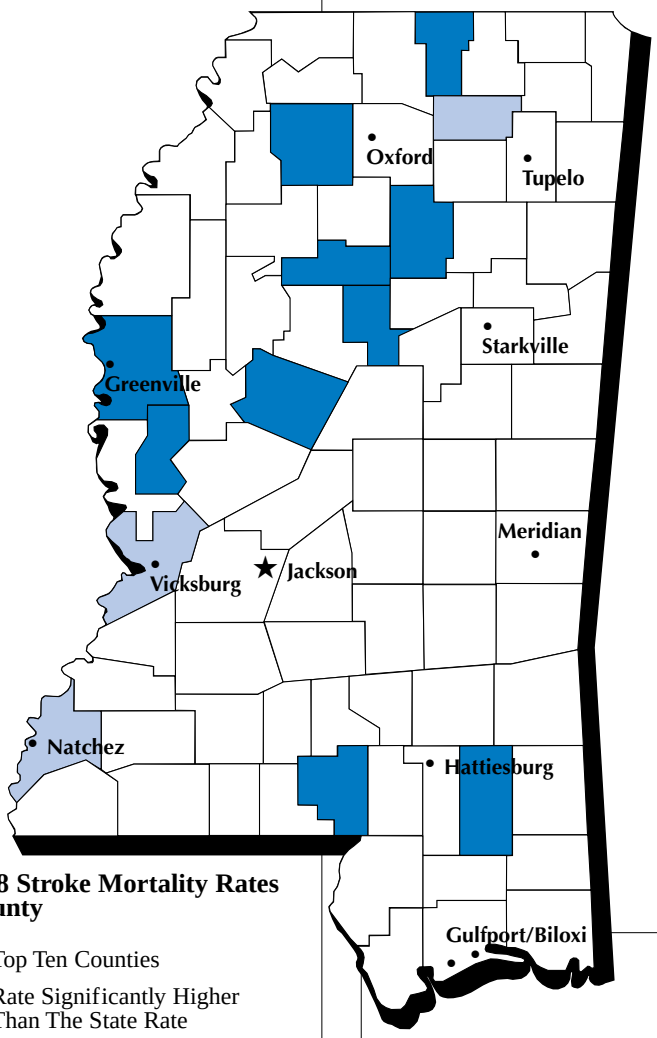
2000 Mississippi Stroke Report

Statistics For Stroke *(or "Brain Attack")*
In Mississippi Including
County-By-County Mortality



1996-98 Stroke Mortality Rates By County

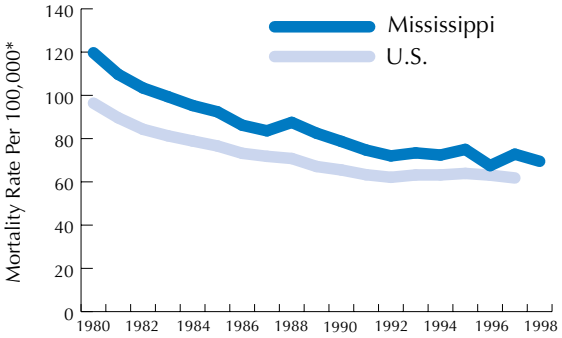
- Top Ten Counties
- Rate Significantly Higher Than The State Rate

Stroke (or "brain attack") is the third leading cause of death across the state, behind heart disease and cancer. In 1998, 1,804 Mississippians died from stroke, and it is estimated that a similar number were left disabled.

See pages 6 - 7 for complete county stroke mortality data in Mississippi.

"Between 1980 and 1997, stroke death rates for the U.S. as a whole declined by 36%, an average of 2.4% per year. Mississippi's stroke death rate declined by 39% over the same period, an average of 2.9% per year. Mississippi's rate, however, remains 18% higher than the U.S. rate."

Stroke Mortality Rates By Year
Mississippi And The U.S., 1980-98



** age adjusted to the 2000 U.S. population*

1998 U.S. rate not available at time of writing

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Contents

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- Mississippi State Department of Health
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- American Heart Association, Southeast Affiliate.

Useful Web Sites

- American Heart Association: http://www.americanheart.org
- American Stroke Association: http://www.strokeassociation.org
- Mississippi State Department of Health:: http://www.msdh.state.ms.us
- NHLBI: http://www.nhlbi.nih.gov
- Mortality data: http://wonder.cdc.gov
- BRFSS: http://www.cdc.gov/nccdphp/brfss

For Further Information

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Executive Summary

- Stroke is the third leading cause of death in Mississippi, accounting for 6.5% of all deaths in 1998

- In 1998, 1,804 Mississippians died from stroke
  - 730 deaths among men and 1,074 deaths among women
  - 1,131 deaths among whites and 673 deaths among African Americans

- Stroke is responsible for a considerable amount of premature mortality: in 1998, nearly one in five of all stroke deaths occurred in Mississippians under 65 years of age

- African Americans have higher stroke mortality rates than whites, and men have higher rates than women.

- In 1998, rates were 78% higher for African American men than white men, and 38% higher for African American women than white women

- Mississippi's stroke mortality rate is the seventh highest in the nation and in 1997 was 18% higher than the rate for the U.S. as a whole

- Stroke death rates in Mississippi are falling, but rates in all population groups now appear to be leveling off

- Stroke mortality rates show a wide variation from county to county — this is largely the result of environmental influences (social, economic, and cultural factors) on the incidence of, and mortality from, stroke

- Thirty-one counties had stroke mortality rates in 1996-98 that have actually increased compared to 1993-95

- Sixty-one percent of Mississippians have at least one stroke risk factor (high blood pressure, smoking, overweight/obesity, high blood cholesterol level, and diabetes)

- Further decreases in the stroke mortality rates will not be achieved unless racial/ethnic and geographic disparities are reduced

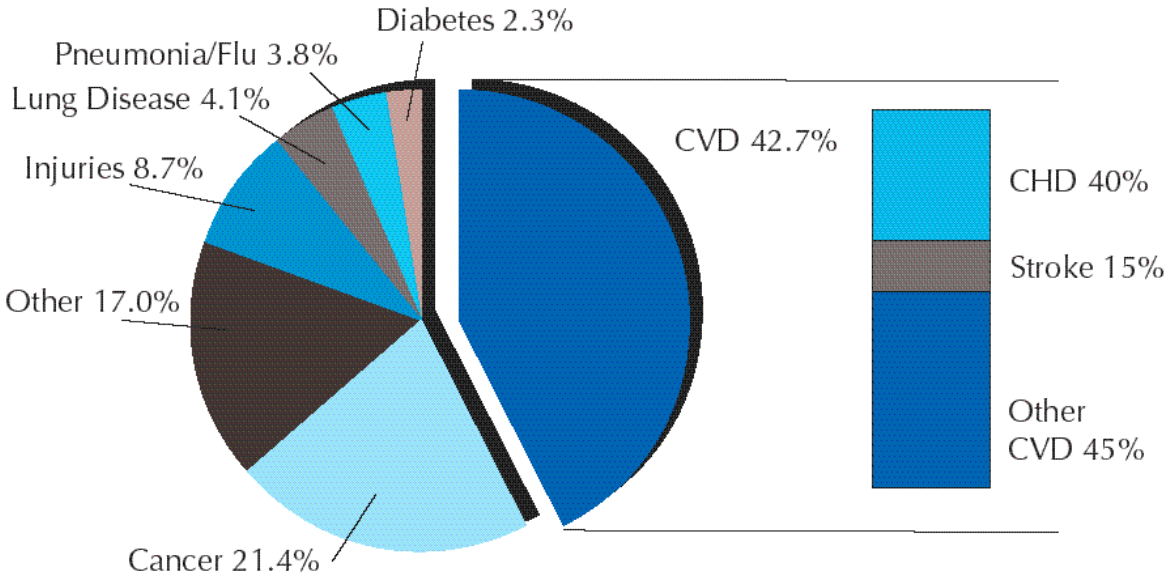
- To reduce the prevalence of stroke risk factors in the population more Mississippians need to control their blood pressure, stop smoking, lose weight, eat a healthier diet, and lower their blood cholesterol level. This prevention must start at an early age, since the processes that lead to stroke in middle or old age begin in childhood

- Much of the death, illness, and disability due to stroke is preventable, but it will not be prevented without population-wide actions by individuals, schools, communities, and workplaces working together to create environments, policies, and norms that support cardiovascular health

Introduction

Stroke results from either obstruction of a blood vessel in the neck or brain causing the brain tissue to be starved of oxygen, or rupture of a blood vessel in the brain resulting in hemorrhage into the brain tissue. The underlying pathology involves thickening and narrowing of the arterial blood vessels in the neck and brain, a process called atherosclerosis, which begins in childhood and progresses over a lifetime. Stroke is manifest usually as sudden onset of paralysis, weakness, or numbness on one side of the body; loss of speech or difficulty talking; partial loss of the field of vision; dizziness or loss of consciousness; and it is a leading cause of death. Although commonly thought of as a condition of old age, stroke is responsible for a considerable amount of premature mortality, here defined as death before age 65. It is also the leading cause of long-term disability among adults.

Figure 1 - Leading Causes Of Death In Mississippi, 1998



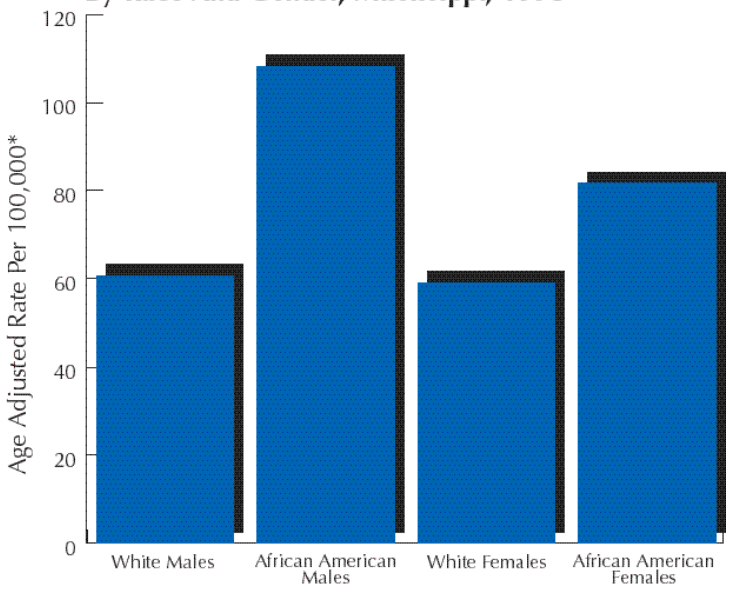
Stroke Incidence And Mortality In Mississippi

Table 1 - Stroke Mortality Rates, Mississippi And The U.S., 1997

1997	Stroke Mortality Rate/100,000*
Mississippi	72.8
U.S.	61.8

**age adjusted to the 2000 U.S. population*

Figure 2 - Stroke Mortality Rates By Race And Gender, Mississippi, 1998



**age adjusted to the 2000 U.S. population*

The exact incidence of stroke in Mississippi is unknown as the state has no stroke register or statewide hospital discharge data system. A very rough estimate is that more than 5,000 Mississippians suffer a stroke each year. Eighty-five percent are of the ischemic (thromboembolic) variety and the remaining 15% are hemorrhagic. Approximately one-third of victims die, one-third become disabled, and one-third recover.

Mississippi's stroke mortality rate is, and has been for many years, one of the highest in the nation. In 1997 (the latest year for which comparable national data are available), Mississippi ranked seventh highest in the U.S., with a stroke mortality rate that was 18% higher than the rate for the U.S. as a whole (Table 1).

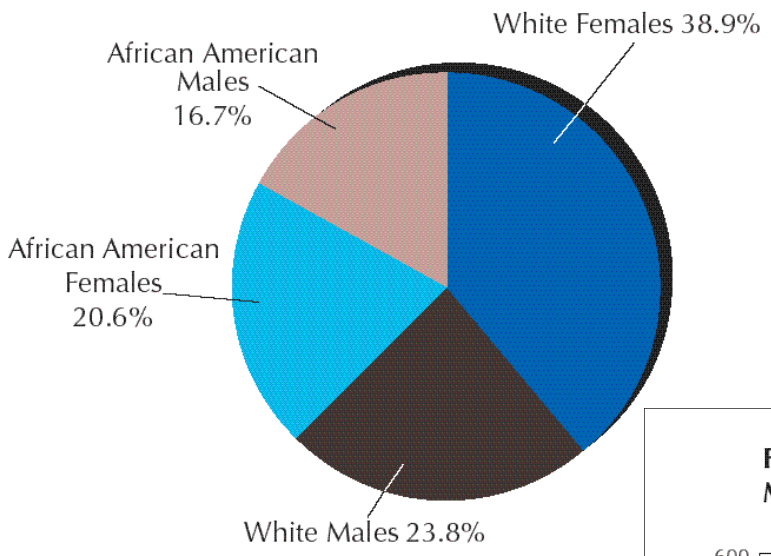
Mississippi is one of eleven states in the southeast region of the U.S. known as the 'Stroke Belt'; this region has for at least 50 years had higher stroke death rates than other U.S. regions.

Stroke death rates differ by racial/ethnic group, gender, and age group. African Americans have higher rates than whites, and men have higher rates than women. In 1998, rates were 78% higher for African American men than white men, and 38% higher for African American women than white women (Figure 2). African-American men had the highest mortality rate: 108.1 per 100,000. The exact reasons for these disparities are unknown.

In terms of absolute numbers of deaths, however, there are more stroke deaths in females than males because more women live to older ages, when stroke is more common. In 1998, there were 1,074 stroke deaths among women and 730 stroke deaths among men (Figure 3).

Stroke is uncommon before middle age; the risk of stroke doubles with each succeeding decade after the age of 55, and stroke death rates increase steeply from middle into old age.

Figure 3 - Proportional Distribution Of Stroke Deaths By Race And Gender, Mississippi, 1998



However, in 1998, nearly one in five of all stroke deaths in Mississippians occurred under 65 years of age (Figure 4). This premature mortality due to stroke is greater for men than women and for African Americans than whites. The largest amount of premature stroke mortality occurs in African American men: 34% of all stroke deaths in this group occurred before age 65 (Figure 5).

Figure 4 - Stroke Deaths By Age Group Mississippi, 1998

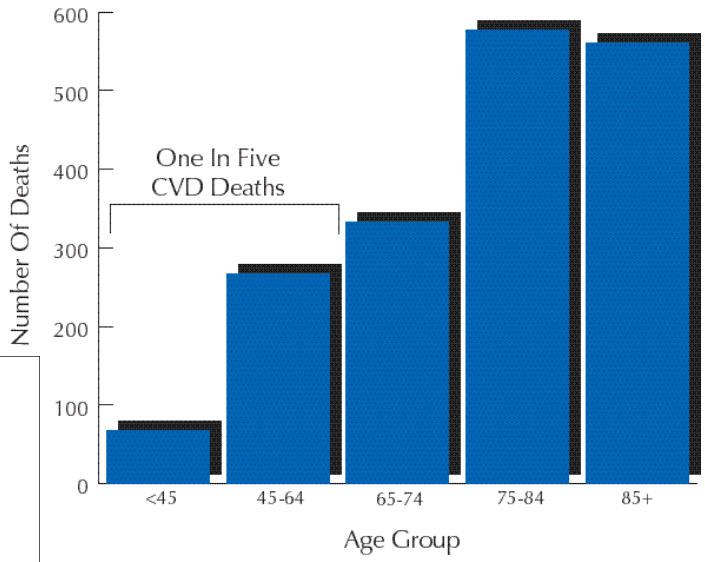
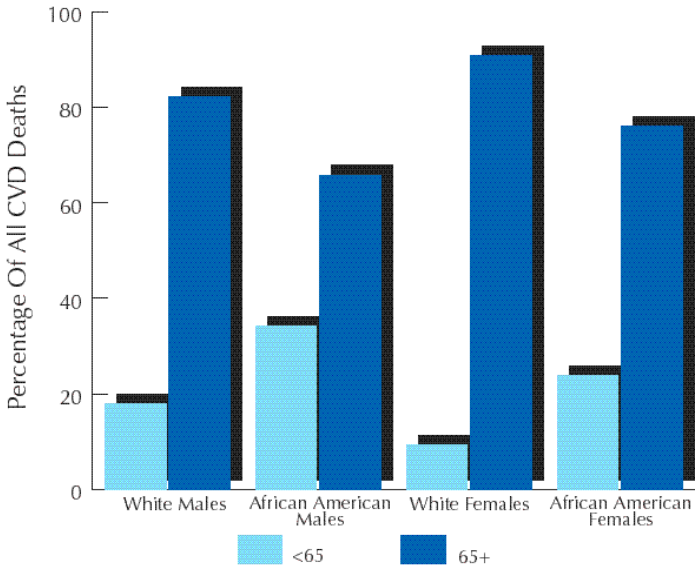
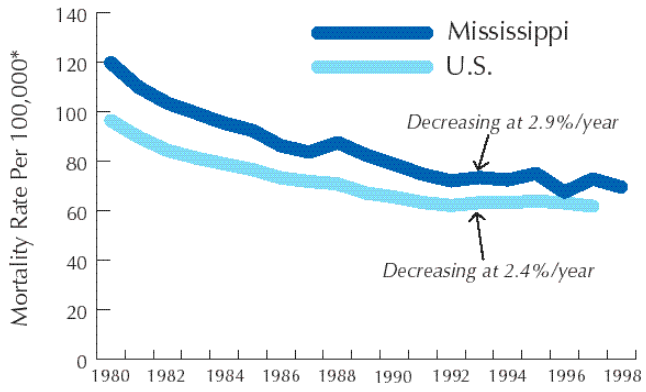


Figure 5 - Premature Stroke Deaths By Race And Gender, Mississippi, 1998



Trends In Stroke Mortality In Mississippi

Figure 6 - Stroke Mortality Rates By Year Mississippi And The U.S., 1980-98

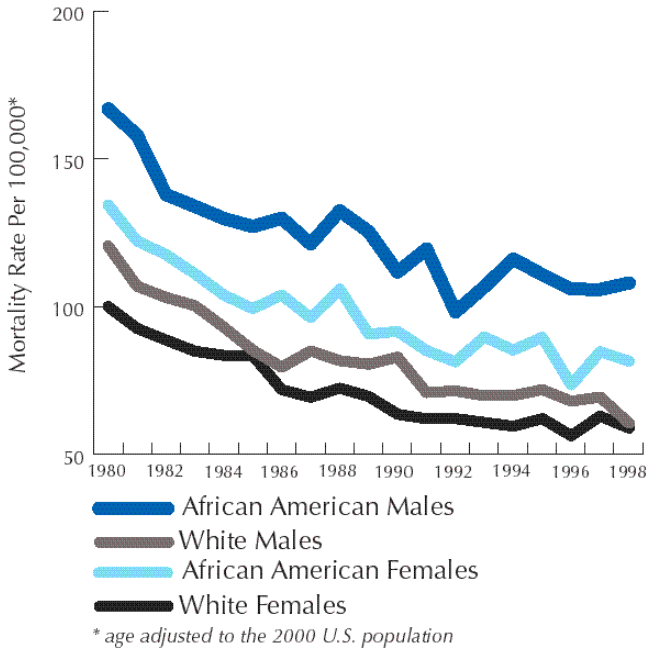


** age adjusted to the 2000 U.S. population*

1998 U.S. rate not available at time of writing

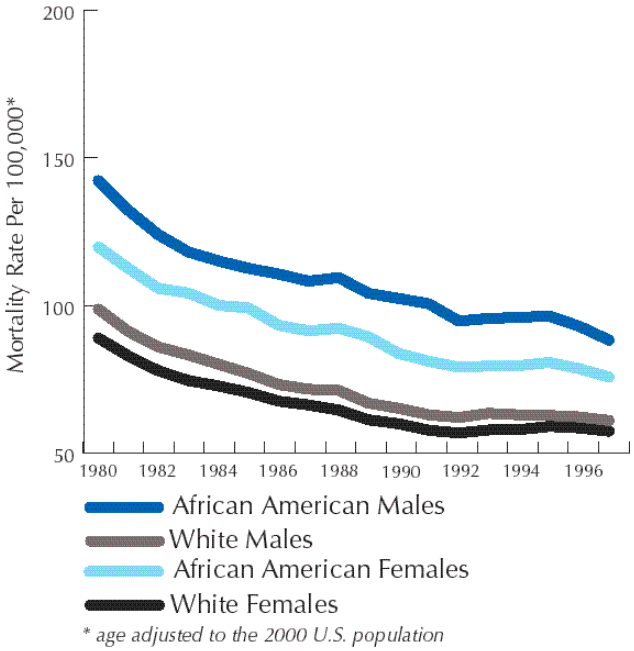
Stroke mortality rates in Mississippi have actually declined slightly faster than U.S rates. Between 1980 and 1997, stroke death rates for the U.S. as a whole declined by 36%, an average of 2.4% per year. Mississippi's stroke death rate declined by 39% over the same period, an average of 2.9% per year. Mississippi's rate, however, remains 18% higher than the U.S. rate (Figure 6). The rate of decline is not the same in all population groups in the state: African American males have shown the least impressive fall over time (Figure 7) and are the only group that has not shown a rate of decline greater than the U.S. as a whole (Figure 8). Rates in all groups now appear to be leveling off.

Figure 7 - Stroke Mortality Rates By Race And Gender, And By Year Mississippi, 1980-98



** age adjusted to the 2000 U.S. population*

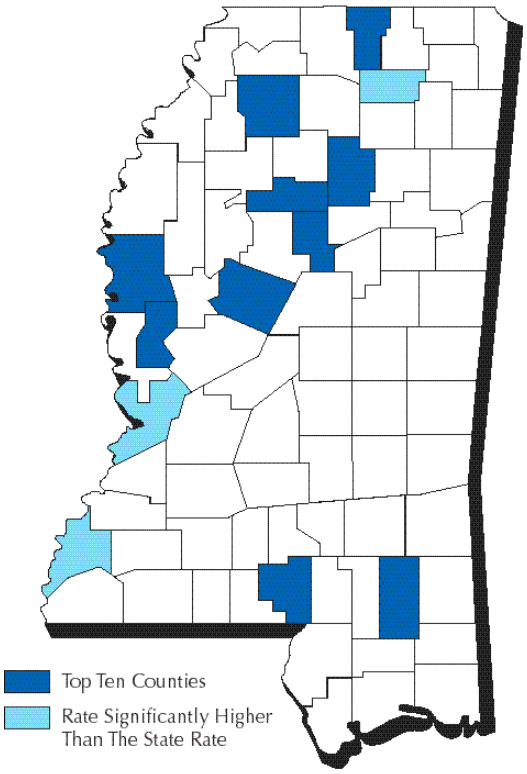
Figure 8 - Stroke Mortality Rates By Race And Gender, And By Year U.S., 1980-97



** age adjusted to the 2000 U.S. population*

Stroke Mortality Statistics By County

Figure 9 - Stroke Mortality Rates By County, 1996-98



Age adjusted stroke mortality rates show a wide variation from county to county, ranging from 145.7 per 100,000 (Grenada) to 41.0 per 100,000 (Amite), a difference of 255% (Figure 9 and Table 2). Grenada county's rate is 110% above the state average. Thirteen of the state's 82 counties have stroke mortality rates that are statistically significantly higher than the state's overall rate. The top ten counties with the highest stroke mortality rates are, in descending order, Grenada, Sharkey, Benton, Marion, Perry, Holmes, Panola, Montgomery, Calhoun and Washington. Such wide variation in rates between counties is largely the result of environmental influences (social, economic, and cultural factors) on the incidence of, and mortality from, stroke, and emphasizes the need for prevention at all levels to reduce these differences. This becomes even more urgent when trend data are examined: compared to 1993-95, thirty-one counties — 8 of the top 10 plus 23 others — had stroke mortality rates in 1996-98 that actually increased, by up to 85% (Figure 10).

Figure 10 - Change In Stroke Mortality Rates By County, Mississippi, 1996-98 vs 1993-95

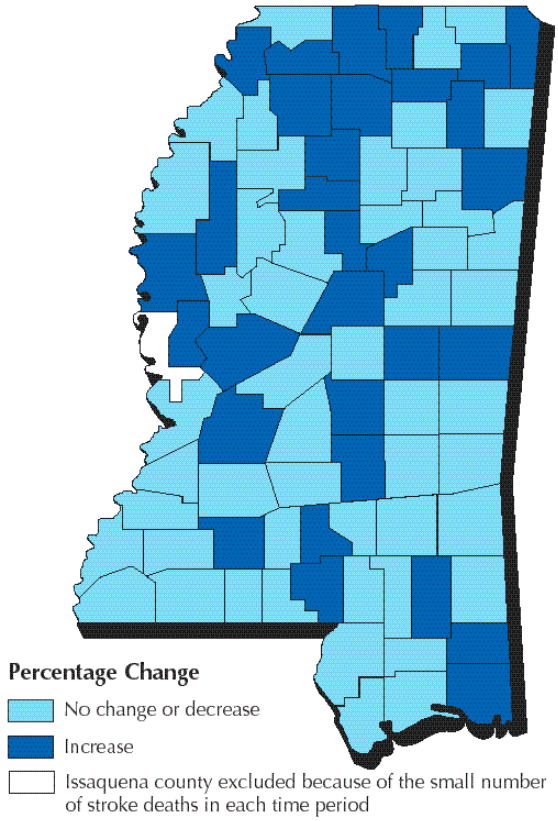


Table 2 - Stroke Death Rates By County

County	No. of stroke deaths in 1998	% of all deaths	No of stroke deaths in 1998 Male	No. of stroke deaths in 1998 Female	Age-adjd. stroke death rate 1996-98	Rate in top 10?	Stat.signif. different from state rate	Age-adjd. stroke death rate 1993-95	% Change in stroke death rate 96-98 vs. 93-95
All MS	1,804	6.5	730	1,074	69.4	n/a	n/a	72.6	-4.4
Adams	40	9.0	19	21	95.1	✗	✓	99.2	-4.2
Alcorn	26	6.8	9	17	62.2	✗	✗	95.5	-34.8
Amite	5	4.1	4	1	41.0	✗	✓	53.5	-23.4
Attala	20	6.5	6	14	81.1	✗	✗	55.4	46.6
Benton	18	15.3	5	13	127.6	✓ (3)	✓	69.2	84.5
Bolivar	30	7.3	14	16	86.9	✗	✗	97.7	-11.1
Calhoun	26	14.0	9	17	97.2	✓ (9)	✓	108.7	-10.6
Carroll	6	5.9	2	4	49.4	✗	✗	70.2	-29.5
Chickasaw	12	6.6	4	8	59.6	✗	✗	71.0	-16.0
Choctaw	5	5.9	1	4	57.2	✗	✗	45.1	26.9
Claiborne	7	6.4	3	4	79.6	✗	✗	112.7	-29.4
Clarke	9	5.6	6	3	54.0	✗	✗	75.4	-28.4
Clay	15	6.2	7	8	67.3	✗	✗	77.0	-12.6
Coahoma	23	6.5	14	9	79.9	✗	✗	109.9	-27.3
Copiah	16	5.6	4	12	48.3	✗	✓	69.1	-30.1
Covington	10	4.3	7	3	78.9	✗	✗	81.4	-3.1
Desoto	35	5.2	17	18	55.5	✗	✓	56.5	-1.8
Forrest	44	6.2	14	30	62.8	✗	✗	84.8	-25.9
Franklin	3	2.4	1	2	52.6	✗	✗	66.1	-20.4
George	13	7.6	5	8	77.6	✗	✗	60.7	28.0
Greene	4	4.5	2	2	44.0	✗	✓	68.8	-36.1
Grenada	27	9.7	8	19	145.7	✓ (1)	✓	138.1	5.5
Hancock	19	4.6	9	10	46.8	✗	✓	53.7	-12.9
Harrison	73	4.2	30	43	51.2	✗	✓	53.7	-4.7
Hinds	156	6.3	59	97	69.5	✗	✗	65.8	5.6
Holmes	27	9.9	14	13	100.9	✓ (6)	✓	185.3	-45.5
Humphreys	7	6.8	5	2	78.7	✗	✗	85.7	-8.2
Issaquena*	0	0.0	0	0	132.6	✗	✗	59.3	
Itawamba	16	6.1	5	11	78.8	✗	✗	109.8	-28.3
Jackson	76	6.8	33	43	72.6	✗	✗	64.2	13.1
Jasper	10	5.2	6	4	58.6	✗	✗	74.9	-21.8
Jeff Davis	6	4.2	1	4	62.7	✗	✗	78.2	-19.8
Jefferson	8	8.0	4	5	75.4	✗	✗	56.0	34.7
Jones	37	5.9	14	23	55.0	✗	✓	67.7	-18
Lafayette	26	8.2	12	14	83.5	✗	✗	64.6	29.3
Lamar	15	5.5	6	9	54.1	✗	✗	59.7	-9.4
Lauderdale	52	5.8	14	38	57.0	✗	✓	56.8	0.2
Lawrence	7	4.6	1	6	76.6	✗	✗	90.8	-15.6
Leake	13	5.2	4	9	68.8	✗	✗	75.3	-8.5
Lee	57	8.5	24	33	78.3	✗	✗	74.4	5.2

Table 2 - Stroke Death Rates By County *(continued)*

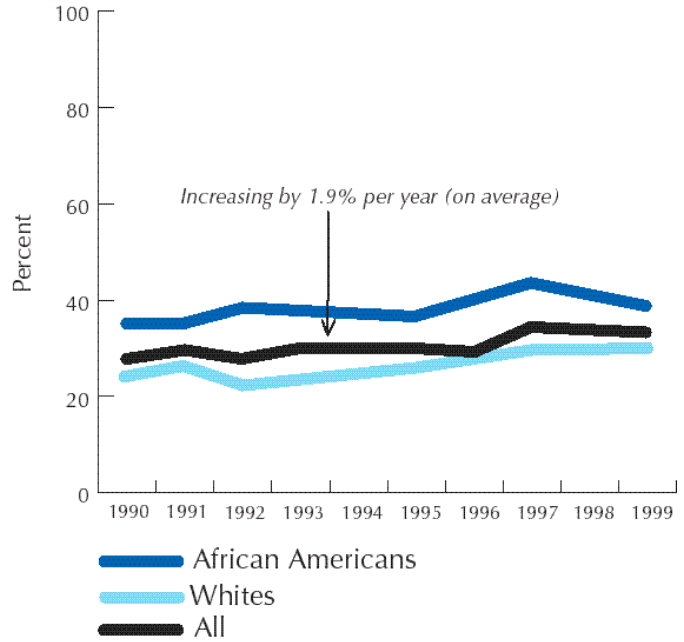
County	No. of stroke deaths in 1998	% of all deaths	No of stroke deaths in 1998 Male	No. of stroke deaths in 1998 Female	Age-adjd. stroke death rate 1996-98	Rate in top 10?	Stat.signif. different from state rate	Age-adjd. stroke death rate 1993-95	% Change in stroke death rate 96-98 vs. 93-95
Leflore	20	5.2	9	11	59.0	✗	✗	72.5	-18.7
Lincoln	31	7.7	11	20	80.1		✗	63.8	25.6
Lowndes	31	5.9	12	19	66.6		✗	69.7	-4.4
Madison	33	6.4	10	23	58.2		✗	62.8	-7.4
Marion	29	9.2	9	20	127.1	✓ (4)	✓	94.8	34.0
Marshall	20	6.6	8	12	80.0	✗	✗	64.4	24.1
Monroe	27	6.7	10	17	73.6	✗	✗	69.3	6.2
Montgomery	18	11.6	6	12	98.0	✓ (8)	✓	89.0	10.1
Neshoba	30	9.1	13	17	85.7	✗	✗	83.4	2.7
Newton	14	5.8	7	7	54.1	✗	✗	66.4	-18.6
Noxubee	6	5.0	1	5	61.4	✗	✗	77.5	-20.8
Oktibbeha	17	6.0	5	12	59.1	✗	✗	76.8	-23.0
Panola	35	9.2	14	21	98.4	✓ (7)	✓	91.2	7.9
Pearl River	20	4.3	9	11	58.2	✗	✗	60.4	-3.7
Perry	12	13.5	6	6	121.5	✓ (5)	✓	71.9	69.0
Pike	23	5.3	10	13	66.7	✗	✗	80.7	-17.3
Pontotoc	14	5.7	8	6	61.5	✗	✗	65.0	-5.5
Prentiss	13	6.4	1	12	55.3	✗	✗	49.8	10.9
Quitman	3	2.3	1	2	48.9	✗	✗	62.9	-22.3
Rankin	42	5.6	16	26	42.3	✗	✓	46.6	-9.2
Scott	15	4.7	6	9	56.3	✗	✗	49.6	13.7
Sharkey	9	11.0	5	4	135.3	✓ (2)	✓	84.1	61.0
Simpson	23	7.2	7	16	73.0	✗	✗	102.1	-28.5
Smith	9	5.5	4	5	71.3	✗	✗	39.5	80.5
Stone	6	4.6	3	3	47.1	✗	✗	66.4	-29.1
Sunflower	21	6.2	8	13	85.3	✗	✗	84.4	1.0
Tallahatchie	9	5.9	4	5	52.8	✗	✗	88.2	-40.1
Tate	12	5.6	4	8	76.1	✗	✗	67.7	12.3
Tippah	15	5.9	8	7	62.0	✗	✗	83.6	-25.8
Tishomingo	17	6.0	5	12	62.1	✗	✗	55.9	10.9
Tunica	5	5.6	2	3	102.0	✗	✗	84.9	20.2
Union	24	9.1	8	16	95.6	✗	✓	77.7	23.1
Walthall	6	3.5	4	2	50.7	✗	✗	55.2	-8.1
Warren	41	8.0	23	18	86.2	✗	✓	102.9	-16.2
Washington	58	8.3	28	30	96.8	✓ (10)	✓	76.6	26.3
Wayne	11	5.2	5	6	60.8	✗	✗	75.2	-19.2
Webster	13	9.8	7	6	65.3	✗	✗	81.3	-19.8
Wilkinson	5	4.1	2	3	63.1	✗	✗	64.9	-2.8
Winston	22	10.1	9	13	77.3	✗	✗	79.0	-2.2
Yalobusha	13	7.1	5	8	94.3	✗	✗	56.0	68.4
Yazoo	28	9.2	14	14	84.1	✗	✗	77.9	8.0

*Note: Issaquena county excluded because of the small number of stroke deaths in each time period.

Risk Factors For Stroke

By definition, a risk factor for stroke is a condition or behavior that increases a person's risk of developing stroke; the risk factor is often directly involved in causing the stroke, though this is not always necessary. Some risk factors are "modifiable": in other words, the risk factor can be controlled or reduced, and the risk of developing stroke lessened. Risk factors for stroke that cannot be changed are age (stroke mortality rates increase as age increases), gender (males have higher stroke mortality rates than women), race (African Americans generally have higher rates than whites), family history of stroke at an early age, and previous medical history of stroke or 'mini-stroke'. The main modifiable risk factors are high blood pressure, smoking, overweight/obesity, high blood cholesterol level, and diabetes. Prevalence data on these are available for Mississippi since 1990. For several risk factors (e.g., overweight/obesity and diabetes), Mississippi has one of the highest prevalence rates in the nation.

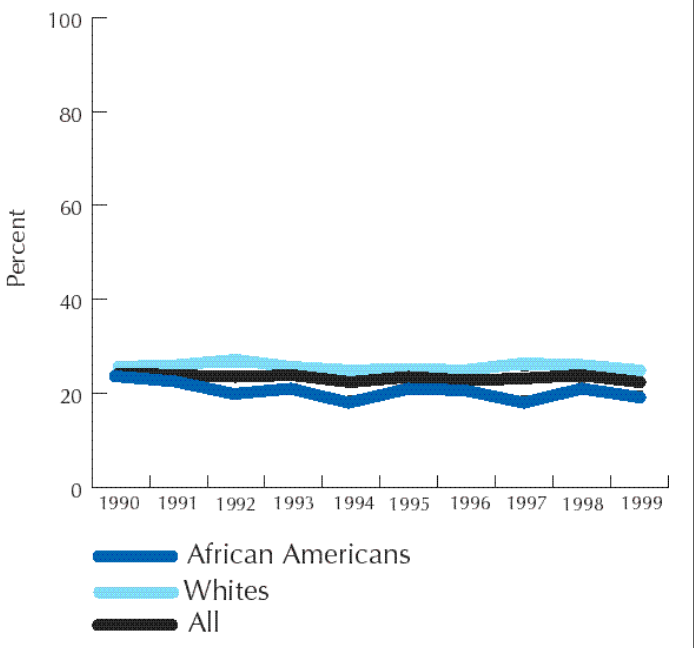
Figure 11 - Percentage of Mississippians Reporting High Blood Pressure, 1990-99



High Blood Pressure (Hypertension)

Hypertension is the single most important risk factor for developing stroke. Between 1990 and 1996, the percentage of adult Mississippians with hypertension remained fairly constant at 28-30%. In 1997, this figure increased to 34% and in 1999 it was 33.5% (Figure 11). Approximately 990,000 adults in the state are now estimated to have hypertension; one third of these (330,000) have not been diagnosed. Of the 660,000 with diagnosed hypertension, it is estimated that half are not on treatment, for various reasons. Hypertension is a major risk factor for both stroke and heart disease, and the high (and rising) prevalence is very likely an important reason for the high stroke and heart disease mortality rates in the state. Public awareness of the dangers of high blood pressure and the importance of controlling it to prevent heart disease and stroke has declined, according to a recently published study. *Every Mississippian should know his/her blood pressure.*

Figure 12 - Percentage of Mississippians Reporting Cigarette Smoking, 1990-99

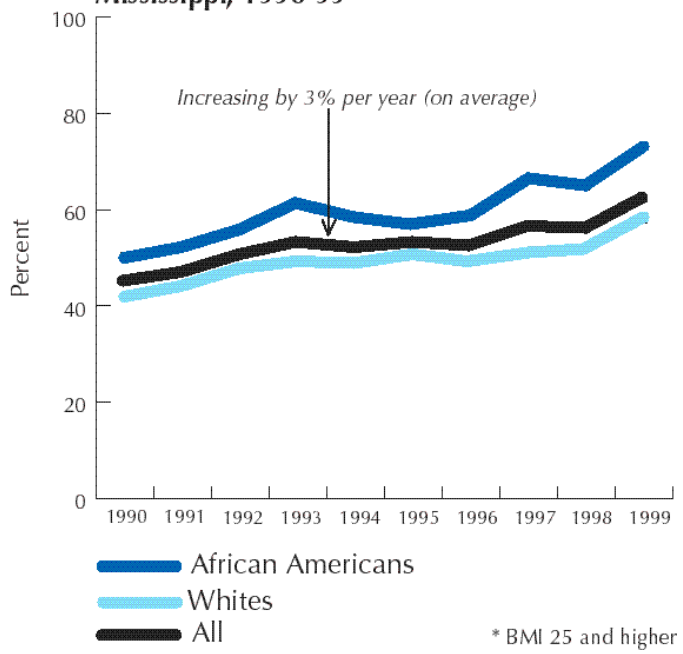


Smoking

Just under one quarter (22.9%) of adult Mississippians are current cigarette smokers, which is only a slight decrease since 1990 (Figure 12).

Although this percentage has decreased considerably since the 1940s and 1950s, when 50-60% of adults smoked, further decrease may be difficult to achieve. Interventions to increase quitting rates are important and will lead to immediate decreases in the smoking prevalence rate, though this group of current smokers probably includes 'hard-core' smokers who are more resistant to quitting. Even more important are interventions to reduce smoking initiation rates in young people: smoking rates in teenagers are actually increasing, especially in adolescent females. Interventions to prevent the use of tobacco will, however, not result in immediate changes in the smoking prevalence rates, and it may take decades before the impact of such preventive interventions becomes apparent.

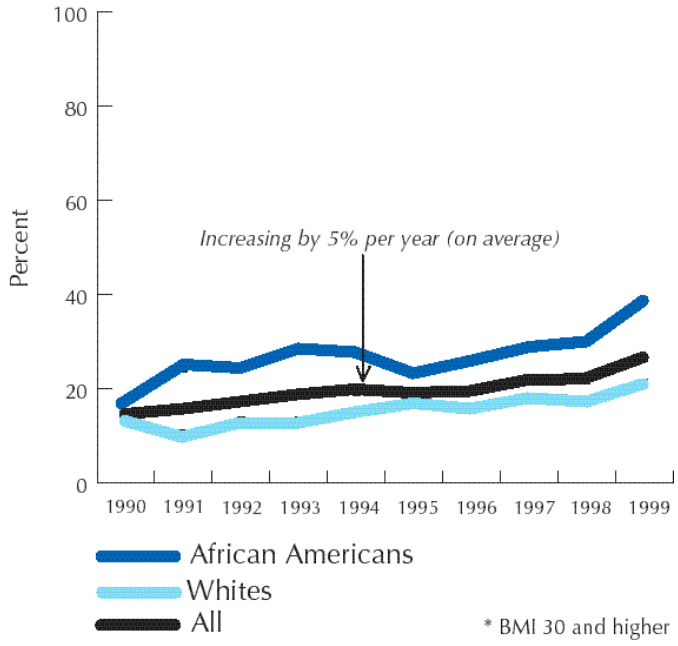
Figure 13a - Combined Prevalence* Of Adult Overweight and Obesity, Mississippi, 1990-99



Overweight/Obesity

In 1998, on the basis of up-to-date data associating overweight with mortality, the NIH/NHLBI changed the definition of overweight to include all persons with a body mass index (BMI) equal to or greater than 25. Mortality is 10-25% higher for persons with a BMI between 25 and 30, and 50-100% higher for persons with a BMI of 30 or more. The percentage of adult Mississippians with a BMI equal to or greater than 25 has increased steadily since 1990, by nearly 3% per year on average; currently 62% of adult Mississippians are overweight (Figure 13a). The rate of obesity is increasing at 5% per year on average, and currently 23% of adult Mississippians are obese (Figure 13b). *Every Mississippian should know his/her BMI.* (The formula for calculating BMI is given in the appendix.)

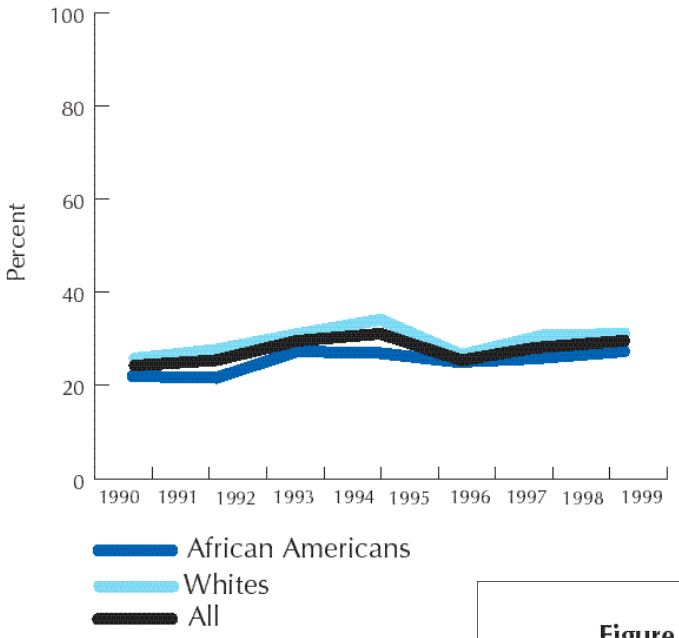
Figure 13b - Prevalence of Adult Obesity* Mississippi, 1990-99



High Blood Cholesterol Level

The percentage of adult Mississippians reporting a high blood cholesterol level has changed little since 1990 and currently stands at about 30% (Figure 14). One-third of adult Mississippians have not had their blood cholesterol level checked within the past five years. *Every Mississippian should know his/her blood cholesterol level*.

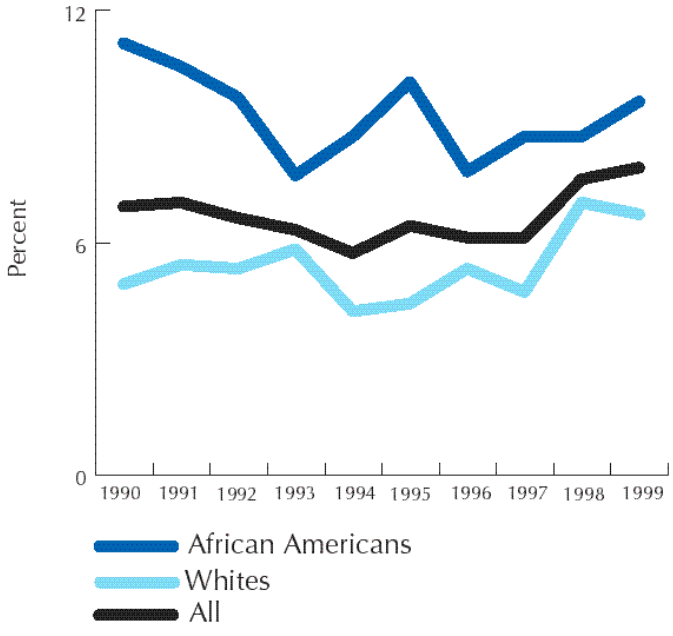
Figure 14 - Percentage of Mississippians Reporting High Cholesterol, 1990-99



Diabetes Mellitus

Diabetes is now recognized as a major, independent risk factor for stroke. Between 1990 and 1997, the percentage of adult Mississippians with diabetes remained fairly constant at around 6%. In 1998, this figure increased to 7.6% and in 1999 it was 7.9% (Figure 15). Approximately 236,000 adults in the state are now estimated to have diabetes; about one third of these (78,000) have not been diagnosed. More than 700,000 adult Mississippians are at risk of developing diabetes in the future, because they are overweight and/or physically inactive. *Every Mississippian should know his/her blood sugar level.*

Figure 15 - Percentage of Mississippians Reporting Diabetes, 1990-99



Clustering Of Stroke Risk Factors

Sixty-one percent of adult Mississippians have at least one of the five main stroke risk factors.

Risk factors for stroke may cluster in some individuals: 20% have at least two factors (Table 3). Most people, however, have only one or two factors.

Table 3 - The Number And Percentage of Mississippians With Modifiable Risk Factors* For Stroke, 1997-98

Number Of Risk Factors	Number Of Adult ** Mississippians	Percent Of Adult** Mississippians	Comments
0	772,171	39.3	—
1	778,099	39.6	60.7% have 1 or more risk factors
2	319,921	16.3	20.3% have 2 or more risk factors
3	79,383	4.0	4.7% have 3 or more risk factors
4	12,962	.07	0.7% have 4 or more risk factors
5	106	< 0.1	—

* *modifiable risk factors include high blood pressure, smoking, overweight/obesity, high blood cholesterol, and diabetes*

** *18 years of age or older*

Summary And Conclusions

This report summarizes the most recent information available on stroke and associated health risk behaviors in Mississippi. Stroke mortality rates in Mississippi have declined but remain significantly higher than U.S. rates, and rates in all population groups now appear to be leveling off. There is a wide variation in mortality rates between counties, and in some counties they have actually increased. Marked racial disparities exist in the rates, and a considerable amount of stroke mortality is premature, especially in African American men.

Why are stroke death rates higher in Mississippi than elsewhere? This cannot be fully explained. A mortality rate reflects both incidence of disease (the rate of development of new cases) and survival after disease has developed (which in turn reflects the severity of the disease and the effect of treatment). Changes in either or both of these will affect mortality. It is not known whether the higher stroke mortality rates in Mississippi are due to higher incidence (more new cases of stroke), more severe disease, poorer survival of persons with stroke, or some combination of these factors. Stroke mortality rates have been declining in Mississippi and the U.S. for most of this century, particularly since the 1950s. The decline has occurred in all age and racial/ethnic groups and both genders, and is presumably due, at least in part, to healthier lifestyles, a lower prevalence of stroke risk factors such as high blood pressure and smoking in the population, and improvements in medical care.

Whatever the gaps in our knowledge, it remains clear that further decreases in stroke mortality rates will not be achieved unless racial/ethnic and geographic disparities are reduced. Further work is needed to identify and quantify differences in the availability of, access to, and quality of medical care for persons with stroke, and to identify and (if possible) eliminate any barriers. Also, much of the death and disability due to stroke is preventable. Primary prevention needs to be emphasized very strongly, to reduce the prevalence of stroke risk factors in the population: more Mississippians need to control their blood pressure, stop smoking, lose weight, eat a healthier diet, and lower their blood cholesterol level. Prevention must start at an early age, since the processes that lead to stroke in middle or old age begin in childhood and adolescence. Control of blood pressure is particularly important in view of the findings of a recently published study that public awareness of the dangers of high blood pressure has declined.

Appendix — Methods, Definitions, And Abbreviations

Methods

Stroke mortality numbers and rates for 1993-98 are based on death certificate data provided by the Bureau of Public Health Statistics, Mississippi State Department of Health (MSDH). Stroke mortality rates for 1980-97 were obtained from the National Center for Health Statistics (NCHS) via CDCs WONDER system at http://wonder.cdc.gov. The most recent year for which the U.S. stroke mortality rates were available was 1997. The following ICD-9 codes were used: CVD: 390-448; CHD: 410-414; Stroke: 430-438; Cancer: 140-208; Female breast cancer: 174; Injuries: E800-E999; Chronic lung disease: 490-496; Diabetes: 250; Pneumonia/Influenza: 480-487.

Crude mortality rates are calculated using number of deaths as the numerator and the most recent mid-year population estimates for the state from the U.S. Census Bureau (www.census.gov) as the denominator. Crude rates are age adjusted by the direct method using the projected 2000 U.S. population as the standard. The estimated annual percent change (EAPC) in rates, referred to in this report as the average change per year, was calculated by fitting a regression line to the natural logarithm (Ln) of the rates (r) using calendar year as a regressor variable, i.e. $y = mx + b$ where $y = \text{Ln } r$ and x = calendar year. The EAPC = $100 (e^{m}-1)$. This calculation assumes that the rates changed at a constant rate over the entire time interval.

In Table 2, county rates are compared to the state rate using a z-test with a significance level of 0.05. The source of the formula for the test and the standard error of an age adjusted rate was the NCHS, CDC (Monthly Vital Statistics Report, volume 45, number 11(S)2, June 12, 1997, p.77).

Risk factor estimates are based on self-reported data from the Mississippi Behavioral Risk Factor Surveillance System (MS-BRFSS). The MS-BRFSS is a continuous, statewide, random-digit-dialed telephone survey of a representative sample of the Mississippi civilian, non-institutionalized adult population (18 years of age and older). The overall sample size for 1990-97 varied between 1,578 and 1,599 persons; in 1998, the sample was increased to 2,307 persons and in 1999 it was 2,180. The MS-BRFSS collects data on a number of health risk behaviors, including smoking, high blood pressure, high blood cholesterol, and diabetes. Respondents are also asked to report weight and height, from which body mass index (BMI) can be calculated.

Note On Race Categories

The two categories of race used in this report are “white” and “African American”. In Mississippi, the population distribution by race is approximately 63% white, 36% African American, and 1% other races (largely Asian/Pacific Islander and American Indian). The number of persons in the “other” race category is too small for a separate analysis.

Definitions

- *Age adjusted death rate*: a crude death rate that has been adjusted statistically (standardized to a reference population) to allow comparisons of rates from different time periods, places, or populations.
- *Incidence*: the number (expressed as a rate) of new cases of a disease in a population.
- *Prevalence*: the number (expressed as proportion or percentage) of existing cases of a disease or risk factor in a population at a specific point in time.
- *High blood pressure*: defined as having been told by a health professional that one's blood pressure is high.
- *Current smoking*: defined as having smoked at least 100 cigarettes in one's lifetime and smoking now (every day or only some days).
- *Overweight/obesity*: defined as having a body mass index (BMI) equal to or greater than 25.0 kg/m^2. Using weight in kilograms and height in meters, BMI equals weight divided by the square of the height. Using weight in pounds and height in inches, BMI equals weight multiplied by 705 and divided by the square of the height.
- *High blood cholesterol level*: defined as having been told by a health professional that one's blood cholesterol level is high (among persons who have ever had a blood cholesterol test).
- *Diabetes*: defined as having been told by a health professional that one has diabetes.

Abbreviations

- CVA = cerebrovascular accident (disease) = stroke
- ICD-9: International Classification of Diseases, 9th Revision
- MSDH = Mississippi State Department of Health
- CDC = Centers for Disease Control and Prevention
- NCHS = National Center for Health Statistics
- NIH/NHLBI = National Institutes of Health/National Heart, Lung, and Blood Institute

Tips For A Healthy Heart

The American Heart Association offers these tips for maintaining good cardiovascular health —

- Avoid tobacco smoke
- Eat foods low in saturated fat, cholesterol, and sodium
- Know and control your blood pressure and cholesterol levels
- Be active

Reduce Your Risk For Heart Disease And Stroke

- *Don't smoke cigarettes.* Tobacco use is the number one preventable cause of heart disease in the U.S. It is also an important risk factor for stroke. Tobacco makes your blood clot easier, stiffens the walls of your arteries, and deprives your heart and brain of needed oxygen. The message is simple: If you use tobacco, stop; if you don't use tobacco, don't start.

- *Stay active.* Moderate physical activity (such as walking, working in the yard, climbing stairs) for a total of 30 minutes a day most days a week helps keep your weight down, allows your body to get rid of "bad" cholesterol, and can help keep your blood pressure under control. Recent research shows that you don't have to do your daily allotment of physical activity at once. Ten or fifteen minutes at a time will do the trick, as long as it adds up to at least 30 minutes most days of the week. It's really simple: just make physical activity a regular part of your life.

- *Eat less fat.* Dietary fats, especially animal fats, pose another big threat to your heart. The American Heart Association recommends that you keep your fat intake to less than 30% of total calories, including no more than 10% of calories from animal or saturated fats. Use the FDA "Nutrition Facts" on food labels to help you cut down on your fat intake. The American Heart Association also has free dietary recommendations.

- *Check your blood pressure.* Uncontrolled high blood pressure is a leading risk factor for stroke, which is like a heart attack, only in the brain. Stroke is a leading cause of disability and the third leading cause of death. If your blood pressure is normal, get it checked at least every two years.

  If your blood pressure is 130/85 or over, consult a physician. He or she can help you get it under control.

- *Check your cholesterol level.* If your cholesterol is normal (less than 200), get it checked every five years. If it's high, see your doctor about getting it under control. Eating foods that contain no cholesterol, such as fruits and vegetables, and staying physically active are two easy ways to keep your cholesterol low.

- *Recognize and treat diabetes.* Having diabetes (high blood sugar) can seriously increase your risk of stroke and heart disease. If you have diabetes, you can prevent or delay stroke and heart disease by controlling your weight, cholesterol, and blood pressure.

- *Know your family's heart history.* Heart disease often runs in families. If your family has a history of heart disease, you may be at increased risk. If so, don't despair. You can readily reduce that risk by taking action now with the above steps. Your family will thank you for it.